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MAJOR WAYNE A. GREEN

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
SCHOOL OF ADVANCED MILITARY STUDIES
COMMAND AND GENERAL STAFF COLLEGE
FORT LEAVENWORTH, KANSAS 66027

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In the light of a new emerging threat and its implication for an American Army exploring potential technologies and concepts for the year 2025; this monograph will explore the following: Can the proposed Army After Next (AAN) tactical methods disintegrate an asymmetric enemy operating in an urban environment? Theory provides a useful tool to discover valid new approaches to counter asymmetric threats. Therefore, complexity theory and general systems theory form the foundation for our understanding of disintegration theory as presented by Dr. James Schneider in his monograph: "Cybershock: Cybernetic Paralysis as a New form of Warfare." This monograph outlines the theoretical presuppositions and logic of disintegration theory to create a mental library of abstract concepts from which to generate viable tactical options to counter asymmetric urban threats. History then provides empirical evidence that adds pragmatism and validity to the more abstract concepts outlined by theory. The Battle of Mogadishu serves as a recent example.

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ATTACKING CELL PHONES WITH SABOTS: DISINTEGRATION OF AN ASYMMETRICAL URBAN THREAT IN THE YEAR 2025

A MONOGRAPH
BY
Major Wayne A. Green
Armor

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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SCHOOL OF ADVANCED MILITARY STUDIES

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Major Wayne A. Green

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Approved by:

Victor M. Robertson IV
LTC Victor M. Robertson, MMAS — Monograph Director

Robin P. Swan
LTC Robin P. Swan, MMAS — Director, School of Advanced Military Studies

Philip J. Brookes
Philip J. Brookes, Ph.D. — Director, Graduate Degree Program

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CHAPTER 1

INTRODUCTION

The U.S. Marine Corps Commandant, General Charles Krulak, in a statement describing the U.S. military's growing reliance on technology, warned: "Future war is most likely not the son of Desert Storm; rather it will be the stepchild of Somalia and Chechnya."[1]

> In mid-1991, sensing weakness and confusion within the Kremlin, nationalist leaders within the Chechen Republic began to press their independence demands. . Using various means, the Chechens acquired a large portion of Soviet military equipment deployed on their territory. . . in December 1994, the Russian government deployed both regular and internal forces to crush Chechnya's independence movement. Two years later, after tens of thousands of casualties, with much of Chechnya in ruins and with the Russian security establishment badly shaken, a tentative cease fire was established in December 1996. Russian forces have recently pulled out of Chechnya.[2]

In the light of a new emerging threat and its implication for an American Army exploring potential technologies and concepts for the year 2025; this monograph will explore the following: Can the proposed Army After Next (AAN) tactical methods disintegrate an asymmetric enemy operating in an urban environment? Theory provides a useful tool to discover valid new approaches to counter asymmetric threats. Therefore, complexity theory and general systems theory form the foundation for our understanding of disintegration theory as presented by Dr. James Schneider in his monograph: "Cybershock: Cybernetic Paralysis as a New form of Warfare."[3] This monograph outlines the theoretical presuppositions and logic of disintegration theory to create a mental library of abstract concepts from which to generate viable tactical options to counter asymmetric urban threats. History then provides empirical evidence that adds

pragmatism and validity to the more abstract concepts outlined by theory. In particular, the Battle of Mogadishu on 3 October 1993 serves as a recent example that conventional firepower applied with an attrition mindset is inadequate to counter an asymmetric threat in urban terrain. Enemy military systems, even insurgent urban threats exhibit the characteristics of an open complex system. As open complex systems they must by their nature have a control mechanism which acts as their central nervous system or brain. As a result, all complex systems are vulnerable to what Schneider refers to as "cyber-shock". Cyber-shock, when applied synergistically with attrition and maneuver, create paralysis annihilation, and exhaustion respectively on an enemy system. Disintegration is the end result.[4] The strategic and operational constraints to win short, decisive campaigns with limited collateral damage impacts the selection of tactical methods. Ultimately, this monograph analyzes whether the proposed tactical methods for the AAN force can achieve disintegration at the tactical level.

Analysis of disintegration will further the efforts of the Army After Next Project Working Groups. "The Army After Next Project Mission is to: Conduct broad studies of warfare to about the year 2025 to frame issues vital to the development of the US Army after about 2010 and to provide those issues to the senior Army leadership in a format suitable for integration into TRADOC development programs. "[5] A sub-organization to the AAN Project, the Urban Warfare Project proposes ". . . to examine the conduct of military operations in and around complex and urban terrain in the 2025 time frame with a primary emphasis on warfare at the operational level."[6] The Urban Warfare Project was created to address a ubiquitous and recurring issue; the effectiveness of enemy asymmetric responses in urban terrain.

Army After Next concepts appear sound except when the Battle Force is challenged by an "asymmetric" threat operating in urban terrain. The 1997 Annual Report to the Chief of Staff of the Army on the Army After Next Project indicated that:

> Red's learning curve rose sharply as the wargames progressed. Confronted by overwhelming combat power, he resorted to asymmetric responses in an effort to offset Blue's advantages. He recognized early on that Blue's superiority, particularly in firepower and information dominance, eroded over time. Any action that heightened ambiguity or complexity, and thus increased the time Blue needed to gain control of the situation, benefited Red. Therefore, Red moved rapidly to complex terrain-urban, suburban, and in some cases, forests and mountains. . . .The lesson is obvious. For the 2020 Blue forces, time is the worst of enemies.[7]

A threat evaluation for the year 2020-2025 highlights the likelihood of the above threat scenario. "According to United Nations' estimates, the urban population of developing countries worldwide increases by about 150,000 each day. By 2025, at least 60 percent of the world's population- five billion people - will live in urban areas."[8] Further, a study prepared by the Marine Corps Intelligence Agency in November 1997 concluded that this increased urbanization will serve as an ever growing source of conflict and instability.[9] Finally, these urban complexes will serve as a safe haven for future enemy forces seeking a response to a technologically superior American military. These preliminary results lay the foundation for future experimentation and present a significant dilemma for the development of AAN strategic, operational and tactical concepts.

The draft AAN "How to Fight Manual" provides a vision of future war and the corresponding AAN strategic and operational concepts. This manual defines the overarching US strategic concept for 2020+ as consisting of the following three elements:

First, The United States must maintain and shape the peace with allies and partners who share our interests. Next, it is in the interest of the Untied States to maintain a regional system of crisis response and conflict containment. **Finally, when crisis results in war, the United States must win short, decisive, and limited collateral damage campaigns to achieve a stable peace.**[10] While an in depth study of each of these elements is important to an understanding of the direction of the AAN project, this monograph will focus on the strategic requirement to ". . . win short, decisive, and limited collateral damage campaigns. . . ." The Draft AAN "How to Fight Manual" highlights the relevance of identifying these strategic constraints.

> (1) The United States must be prepared for combined operations in large urban complexes where it will be important to try to limit collateral damage.
>
> (2) Only short and decisive campaigns will be considered "winning" ones.
>
> a.) The cost of war to modern societies is such that political leaders will hesitate to engage in military campaigns unless the result can be quick and decisive. This is likely to be even more true in a more developed, more economically integrated world.
>
> b.) It is likely that conflict will occur in large urban complexes of our allies, and that civilian leaders will want to minimize the suffering and the cost of reconstruction. The potential destructive power of aggression by conventional forces in the urbanized sprawl of the future can be devastating. Not only will conflict be costly in lives, but the loss of economic infrastructures can set a region of the world back many years. The integrated nature of many of the world's economies can spread the effects of war throughout the global economy.
>
> (3) A great power should have a choice of operational methods. In theory, there are two approaches to winning campaigns in war- attrition and disintegration.[11]

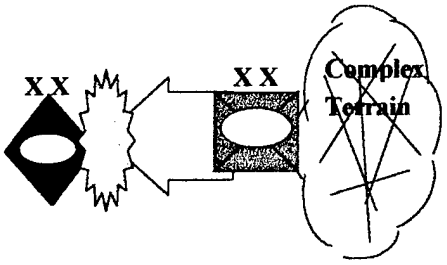
The requirement to win short, decisive, and limited collateral damage campaigns is at odds with the historical outcomes for battles and campaigns conducted in urban terrain.

Urban battles are traditionally resource intensive, costly and destructive affairs that hinder the effectiveness of firepower and mobility.

Urban terrain diminishes Army After Next battle force advantages. The Army After Next wargames to date indicate that the Army After Next operational and tactical methods (described in Chapter 4) are largely successful in destroying a conventional enemy threat in open terrain. This dominance prompts the REDFOR to conduct a survivability maneuver into complex terrain in an attempt to reduce BLUFOR's information and firepower advantage. "The Spring 1998 Army 2025 wargame results clearly demonstrated that areas of complex urban terrain will serve as both important operational objectives and a means of force protection for enemy forces during future military operations."[12] "Because of this, U.S. forces must be prepared (organized, equipped, trained) to conduct all types of military operations as effectively in complex terrain as they do in open terrain."[13] The AAN wargames indicated that adjustments to AAN operational and tactical concepts were required.

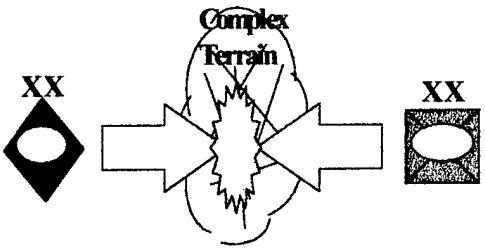
The Urban Working Group (J8) of the TRADOC Future Battle Directorate, headed by LTC Robert Hahn II, drafted an Urban Warfare Operational Concept dated 2 September, 1998 to address the glaring dilemma proposed by complex terrain. While not touted as a doctrinal solution, the concept development was "solely intended to provide input into the process through which the J8 will develop an operational concept for use during the 29 September, 1998 urban wargame. . . .The concept's purpose was to describe a basic framework for conducting large scale, joint force combat operations in and around complex urban terrain."[14] The four operational level options designed by the working group include: Preemption/Preclusion, Denial, Containment, and Eviction.

Preclusion/Preemption



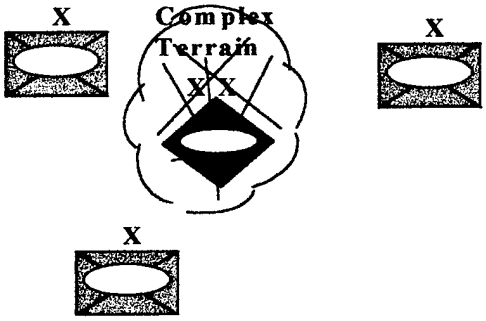
Preclusion/Preemption is an operation designed to prevent an enemy from employing his forces in a manner or location critical to the successful accomplishment of his overall objectives. [15]

Denial



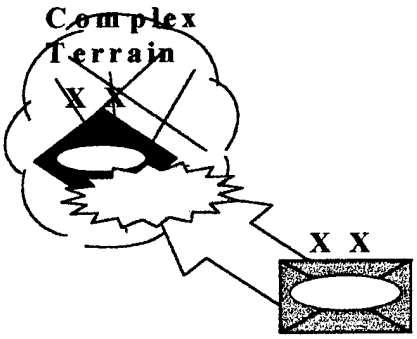
Denial is an operation designed to prevent or hinder enemy occupation of, or benefit from, areas or objects having tactical, operational or strategic value. [16]

Containment



Containment is an operation designed to hold, or surround, the forces of the enemy or to cause the enemy to center activity on a given front and to prevent his withdrawing any part of his forces for use elsewhere. [17]

Eviction



Eviction is an operation designed to force the enemy to withdraw from an occupied area or face the destruction or capture of his military forces. [18]

Preclusion and Denial seek to leverage the advantage of knowledge, speed, mobility and lethality of the AAN Battle Force to prevent occupation of complex urban terrain. In effect, this anti-access concept provides the most favorable options in terms of maintaining the advantages in knowledge and speed organic to the AAN Battle Force. Containment and eviction, however, represent a much more unfavorable but realistic situation for BLUFOR. A containment or eviction operation is required if the enemy occupies urban terrain before the AAN Battle Force can intervene. While experimentation and concept development continues to focus on the operational level, the working group suggests that a new tactical concept is required for successful Operational Eviction.[19] In all four cases, but particularly when eviction is required, *disintegration* offers a defeat mechanism to restore an operational and tactical advantage to BLUFOR.

The future strategic environment will demand "short, decisive campaigns and battles"[20] that limit collateral damage to infrastructure and minimize non-combatant and friendly force casualties. These constraints upon military operations are not simply *desired* effects mandated by the American political and strategic environment. Due to the nature of complex adaptive systems, short decisive blows against the enemy are a matter of operational and tactical *necessity*. The failure to disintegrate a complex enemy system will result in a prolonged and costly urban fight at the tactical level that will likely end in the failure to achieve strategic or operational desired effects. As the AAN wargames have demonstrated, the complex enemy system facing the AAN Battle Force is a chameleon. In the absence of short, decisive blows, the urban enemy complex system will continue to self-organize and adapt to BLUFOR actions. In effect, the absence of

disintegration allows the chameleon the time to "change colors" and present another problem set for which BLUFOR is unprepared. Theory provides a necessary framework for understanding the nature of complex enemies and for formulating potential methods to defeat them on the urban battlefield.

CHAPTER 2

THE THEORETICAL FOUNDATIONS OF DISINTEGRATION

Disintegration is a valuable theoretical construct and conceptual solution to the problem posed by a complex system operating in urban terrain. It seeks a balanced and synergistic effect from attrition, maneuver and cyber-shock, conducted simultaneously against a complex enemy system. Disintegration seeks to destroy the coherence of the enemy system by using cyber-shock to paralyze the enemy system's control mechanisms and prevent it from developing an asymmetric response. A paralyzed enemy is then susceptible to the annihilation effects of attrition and the exhaustion wrought by maneuver.

While the notion of asymmetric response has recently entered the American military establishment's lexicon, it is ill-defined and therefore often misunderstood. Asymmetry, or the lack of symmetry, is defined in common usage as "the lack of correspondence of form and arrangement of parts on opposite sides of a boundary."[21] Therefore, asymmetrical responses are not mirror images of one another. The Draft FM 100-5 dated 19 June 1998 suggests that a symmetrical response is one which mirrors the strengths of the enemy whereby ". . .similar forces conducting similar actions seek to generate similar effects."[22] Further, the theorist B.H. Liddell Hart referred to symmetry as the direct approach and conversely asymmetry as the indirect approach. In his 1923 essay "The Napoleanic Fallacy", Hart explained:

> More and more clearly has the fact emerged that the direct approach to the object or the objective along the **'line of natural**

> **expectation'** has ever tended to negative results. The reason being that the strength of an enemy country or force lies far less in its numbers or resources than in its stability or equilibrium. . .The decisive victories in military history have come from the strategy of the indirect approach, wherein the dislocation of the enemy's moral, mental or material balance is the vital prelude to an attempt at his overthrow.[23]

For the purposes of this paper, then, an asymmetric response is a response which does not follow the "natural line of expectation" of the enemy and therefore presents a problem set for which the enemy is not adequately prepared. Asymmetry is at the heart of understanding the utility of disintegration.

Disintegration views the enemy not as a target but as a complex adaptive system that is capable of asymmetric responses to friendly actions. From an attrition standpoint the enemy is viewed as a target. As a target the enemy is primarily destroyed by physical means. As a complex system the enemy possesses control mechanisms that serve as both the system strength and it's weakness. Control mechanisms allow for the dynamic interaction of the component parts that makes a system adaptive and self-regulating. This adaptive nature drives complex systems to seek asymmetric responses to enemy actions. Conversely, paralysis of enemy control mechanisms through cyber-shock causes enemy systems to lose their dynamism and denies them the capability to produce an asymmetric response. The enemy system becomes incapable of determining or adapting to the friendly natural line of expectation.

The AAN BLUFOR demonstrates that it's natural line of expectation is to exploit its advantages in speed, mobility, knowledge dominance and precision firepower versus an enemy exposed in vulnerable, open terrain. In short, AAN BLUFOR has pursued an attrition approach enabled by precision maneuver, precision engagement and knowledge

dominance to destroy its enemies in open terrain. History shows that forces have successfully sought the shielding effects of an urban environment when faced by a force bound to a purely attrition and maneuver mindset.[24] As REDFOR demonstrated in the AAN Spring 1998 Wargame, the more that BLUFOR seemed enamored by firepower, technology and mobility, the more of an asymmetric response the city afforded. As MG Robert H. Scales Jr., Commandant of the U.S. Army War College, indicates, urban terrain is the great equalizer.

> Red understands that his intent must be not to seek a clear victory but to avoid losing. . . . If he can delay, disrupt, and diffuse our effort to achieve a quick decision, he might be able to force a campaign of attrition in which disproportionate casualties could induce us to grow weary of the conflict.[25]

A solution to REDFOR's asymmetric response, therefore, requires AAN to rethink its natural line of expectation and the fallacy of the pre-eminence of attrition and maneuver alone to destroy complex systems. Fundamentally, AAN tactical forces must use asymmetry against its urban enemy, while denying the enemy the capability to do so in return. Additionally, as Hart encourages, we must consider the enemy's natural line of expectation. Namely, we must resist an approach that focuses solely on attrition and maneuver alone and seek an operational and tactical concept which also seeks to "dislocate the enemy's moral, mental or material balance."[26] Any conceptual approach must have its footings in an understanding of the rise and nature of complex enemy systems.

The notion of the enemy as a complex, adaptive, self-organizing system began to emerge with the earliest innovations of the Industrial Revolution. Our understanding of complex military systems, then, must begin with an understanding of the patterns of

warfare that existed prior to and emerged from the Industrial Revolution. "In 1900 Hans Delbruck, a German military historian, published the first of four volumes of a work entitled History of the Art of War Within the Framework of Political History. Delbruck concluded that the whole history of warfare could be expressed by two patterns of defeat. The first pattern: Niederwerfungsstrategie, is a strategy of annihilation. The second pattern; Ermattungsstrategie, is a strategy of exhaustion. Annihilation aimed at the destruction of the enemy's army through a decisive battle of attrition. Exhaustion sought the enemy's moral and logistical collapse through a combination of attrition and maneuver."[27] Dr. Schneider offers that "pre-industrial armies of physical shock and fire action were rather simple military systems."[28] The Industrial Revolution changed the face of the battlefield in scope and complexity. As Schneider asserts: "The technology of the Industrial Revolution was dominated by innovations in distributed technology. . the geometry of warfare changed from action 'compressed into a single point' to action distributed in breadth and depth. These changes contributed to the "complexification"[29] of the battlefield. Attrition and maneuver focused on the movement to, and conduct of, one decisive battle at a single point was no longer legitimate. In fact one decisive battle of attrition was no longer possible. Fundamentally, the Industrial Revolution transformed the simple armies of Napoleon into modern armies of great complexity."[30]

Amid this time of growing complexity for the military and for the world in general, the General System's Theory arose to describe the characteristics of complex adaptive systems. "The systems concept was formulated by the Hungarian scientist Ludwig von Bertalanffy, whose main contribution was the basic rationale for the interdisciplinary approach to systems. His concept grew out of a growing skepticism

regarding the abilities of the prevailing analytical-mechanistic approaches to respond adequately to challenges posed by the complexities of modern society and technology."[31] Bertalanffy stated:

> It is a change in basic categories of thought of which the complexities of modern technology are only one - and possibly not the most important manifestation. In one way or another we are forced to deal with complexities, with 'wholes' or systems, in all fields of knowledge. This implies a basic reorientation in scientific thinking.[32]

Expanding on Bertalanffy's "Vision of the Whole", M. Mitchell Waldrop in Complexity outlines the characteristics of a complex system. First, ". . .a system is complex in the sense that a **great many independent agents are interacting** with each other in a great many ways."[33] Second,

> . . .the very richness of these interactions allows a system as a whole to undergo **spontaneous self-organization** whereby. . . groups of agents seeking mutual accommodation and self-consistency somehow manage to transcend themselves, acquiring collective properties such as life, thought, and purpose that they might never have possessed individually.[34]

Furthermore, ". . . these complex, self-organizing systems are **adaptive**, in that they don't just passively respond to events the way a rock might roll around in an earthquake. They actively try to turn whatever happens to their advantage."[35] Fourth, ". . .every one of these complex, self-organizing, adaptive systems possesses a kind of **dynamism** that makes them qualitatively different from static objects (such as a snowflake) which are merely complicated. . . .These systems have found a **mechanism** to bring order and chaos into a sort of balance - often called the edge of chaos - which is where the components of a system never quite lock into place (become rigid) and yet never quite dissolve into turbulence either."[36] A complex enemy is one composed of many constituent parts and

capable of self-organization and adaptation to a rapidly changing environment because of a dynamic interaction of these parts. In citing Waldrop, Schneider asserts that it is ". . .essentially meaningless to talk about a complex adaptive system being in equilibrium: the system can never get there. It is always in transition."[37] How can systems possess and maintain this dynamism, self-organization and adaptability? Interestingly the answer to this question illuminates both the strength and the weakness of complex open systems.

All complex open military systems must have a control mechanism to maintain the dynamism which is necessary for it to remain adaptive and self-organizing. James R. Beniger in his book, The Control Revolution, explains this phenomenon through the analysis of living systems. First, he defines control as "the purposive influence toward a pre-determined goal."[38] Next, he suggests that control is "achieved through programming: it depends upon physically encoded information which must include both goals toward which a process is to be influenced and the procedures for processing additional information toward that end."[39] Finally, he indicates that systems require inputs of information to control by making decisions.[40] Dr. Schneider reinforces this analysis by concluding that "there are a number of aspects of complexity but all turn on the way a complex adaptive dynamic system uses information."[41] He asserts that a modern complex military system uses information five ways. "First, it uses information to describe itself and its enemy. Second, a complex military system uses information to organize itself. Third, the complexification of the battlefield and the rise of the operational art made armies algorithmically complex. Complex systems require an ability to process more information to deal with this complexity. Fourth, the logistics of

information - its acquisition, processing and distribution- became complex. Finally, military technology makes modern forces complex, thus requiring more and better information."[42] In short, because systems are complex they use information dynamically to create asymmetrical responses.

The French sociologist Emilie Durkheim concluded that a system could fail as individuals that composed the system became isolated. This concept of *anomie* results when communication between the individuals loses clarity and they begin to lose sight of the organization's intended direction and purpose.[43] This has profound implications for understanding the vulnerabilities of a complex military system. Clearly, information necessary to transmit direction and purpose is at the heart of the control mechanism of a complex military system.

While the control mechanism lends powerful attributes to the system it also burdens the system. The system must maintain its information diet in order to nurture the system and keep it focused on its intended purpose or aim. Without control a complex system accelerates towards what Beniger refers to as "Heat Death" or ". . .an unorganized, randomly distributed, inconvertible state of its particles (components). . . ." Beniger asserts that based upon the 2nd law of thermodynamics, a system's energy cannot be converted from one form to another without decreasing its organization and hence its ability to do further work. Herein lies the vulnerability of complex open military systems. Without an effective control mechanism, open military systems face an inevitable death because they lose the dynamism to recognize changes in their environment and adapt to them. "Living systems are open systems that continuously lose energy to their environments."[44] As a result, systems tend toward greater entropy or

disorder and death. "Thermodynamics thus explains what it is that all living systems must control, and why such control is essential to life itself. All open systems, if they are to postpone for a time their inevitable heat death, must control the extraction and processing of matter (information), its internal distribution and storage, continuous conversion into energy (aims), and elimination as by-product wastes."[45]

Shimon Naveh in his book, In Pursuit of Military Excellence, not only recognizes the central role of a control mechanism but suggests that the system's aim is the control mechanism that essentially defines a complex system and gives it the dynamism required to remain self organizing and adaptive in a turbulent environment. He states: "Clearly, the essence of a system centers on the existence of the interaction between its component parts more than on anything else."[46] He continues by asserting that the interaction of the component parts of a complex system is dominated by the system's aim.

> The initial assertion of the aim by the system's brain or directing authority predetermines the comprehensive whole i.e. the all-embracing accomplishment of its future destined action. It also provides the focus of the system's performance since it creates the framework for the interrelations between its various elements. . . In other words, the definition of aim is the cognitive force that generates the system and determines the directions and patterns of its action.[47]

Accordingly, Naveh asserts that "the aim of a system constitutes its brain, its heart, and its self-regulating agency."[48] The aim constitutes the system brain (nervous system) by providing a "cognitive compass" which keeps the system as a whole moving toward its predetermined goal. The aim resembles the functioning of the heart (circulatory system) by providing the component parts (individual soldiers or units) of the military system with concrete objectives and detailed missions that lead to the overall predetermined

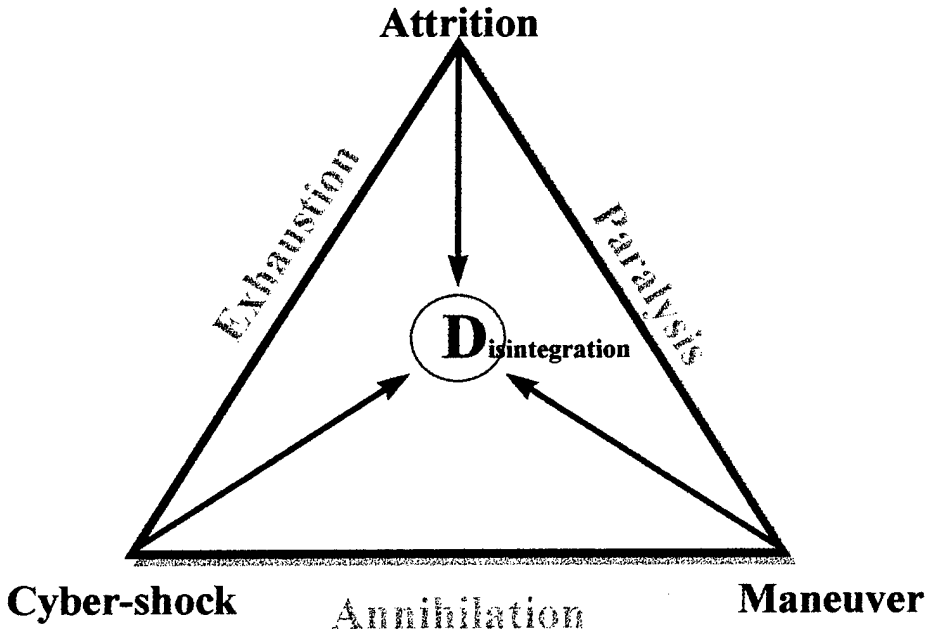
goal. The self-regulating nature of complex systems also rests with the aim because by focusing a system on final objectives aim provides the system a mechanism to overcome external disturbances.[49] Beniger, Schneider, Durkheim, and Naveh all conclude that the information control mechanism, by transmitting aim and purpose, is the element that provides a complex open system with the dynamic interaction that it requires to survive in a turbulent and chaotic environment. This places a premium on the system's ability to share and process information to maintain focus on the predetermined aim.

Because a complex system possesses a dynamic interaction of its component parts dominated by a common aim, *the system will maintain the characteristics of a system until the aim and control mechanisms are removed.* This leads to an important conclusion regarding a purely attrition approach to warfare. The self-regulating ability of complex systems provides the system with a high degree of resiliency.[50] At the tactical level of war it appears conceptually possible to destroy an enemy complex system in one of two ways. This requires physical destruction of *every* component of the tactical system through attrition *or* this requires removal of system aim and control mechanisms. In either case the system loses direction and purpose and the ability to adapt asymmetrically. For a military seeking to limit collateral damage and non-combatant and friendly force casualties in an urban setting, the former option of physical destruction of every system component is infeasible. The use of a purely attrition approach runs counter to the strategic constraints placed upon the American military and will likely produce unsatisfactory results in an environment susceptible to non-combatant casualties and collateral damage. While physical destruction is infeasible, paralyzing the enemy

system's control mechanisms through cyber-shock offers a feasible alternative for destroying a complex enemy in a constrained urban environment.

The Disintegration Alternative

Complex military systems are vulnerable to cybershock which can induce cybernetic paralysis; an inability for a system to effectively control itself.[52] Complex military systems display a noted weakness in that they are dependent upon control mechanisms in order to maintain their self-organizing and adaptive qualities. Disintegration theory suggests that paralyzing an enemy system's control mechanisms through cyber-shock works in compliment with attrition and maneuver to destroy the enemy system. Cyber-shock transforms an enemy from a system capable of asymmetry into isolated component parts that are incapable of a concerted resistance or asymmetric response.



Schneider's Model of Disintegration[51]

"Cybershock is a pattern of warfare that causes paralysis by attacking the enemy's nervous system in the same way maneuver causes exhaustion by defeating the opponent's metabolic system: his logistics."[53] Dr. James J. Schneider concludes that "the emergence of complex military systems created a whole new pattern of defeat that placed cybershock and paralysis on a par with attrition and annihilation and maneuver and exhaustion. However, the cybershock-paralysis defeat pattern does not replace or compete with the other two. Instead, cybershock supplements and complements attrition and maneuver as they work together to create disintegration (see diagram on previous page). Cybershock induces a deep systemic paralysis throughout a complex military system."[54]

> "Cybershock creates paralysis in five ways. First, through the use of operations security, deception operations and psychological operations the enemy is denied complete information both of his adversary and himself. Second, electronic warfare (EW) destroys the organizational coherence and cohesion of the target, essentially inducing a kind of epileptic seizure in the opponent's nervous system. Third, active and intense reconnaissance blinds the enemy and becomes the most critical element in the struggle for information. Fourth, the shock of surprise places a tremendous burden on the enemy's nervous system as it creates a broad state of panic. Finally, the activeness and rapidity of friendly operations induces a kind of cybernetic stupor in the enemy: his nervous system goes into overload and general dissonance sets in. Paralysis and disorganization is complete."[55]

Ultimately for cybershock to induce system paralysis it is necessary to determine our adversary's control mechanism and focus our cybershock efforts at preventing that mechanism from controlling the enemy system. This implies, then, that we must not only understand the aim or purpose of the enemy system but also ". . .destroy the coherence, connection and flow of information among the component parts. . . ."[56] which keeps the enemy system moving towards this predetermined goal. Because the enemy system loses

it capability to adapt to a turbulent environment, cybernetic paralysis sets the conditions for us to accelerate the enemy system to "heat death". Simultaneous rapid maneuver, precision engagement and cybernetic shock seeks a synergism that creates a cascading effect whereby the enemy system breaks apart at the seams. Further, cybernetic paralysis denies the enemy the information necessary to identify and react to our "natural line of expectation". The enemy becomes incapable of further asymmetric response.

This chapter has outlined a theoretical framework for which to understand the nature of our future urban enemies, their potential vulnerability (control mechanisms) and the means (cyber-shock and disintegration) to exploit that vulnerability. Theory has established that our enemies are, and will continue to be, complex adaptive military systems. Further, complex adaptive systems seek an asymmetric approach in order to avoid their enemy's strengths and to magnify their own strengths. An asymmetric retreat to complex urban terrain favors the enemy's efforts to prevent our information and firepower dominance. Beniger and Naveh suggest that complex systems possess a control mechanism which serves as their central nervous system and facilitates this self-organizing and adaptive behavior. This control mechanism serves not only as the system's strength, but also represents a significant vulnerability. Schneider's disintegration theory suggests that the "rise of complex armies created a new array of vulnerabilities that information warfare now seeks to exploit."[57] Disintegration requires not only the capability to attrit and maneuver but also the capability to create cybernetic paralysis which attacks the enemy's control mechanism, at least temporarily paralyzing his ability to self organize and adapt. Attrition, maneuver and cyber-shock work in tandem to destroy, exhaust, and paralyze the enemy. Without the synergistic effects of

all three mechanisms, the enemy system not only lives to fight another day but organizes himself in a manner which risks the defeat of the American force. The American and Somali experiences in the Battle of Mogadishu add pragmatism to these theoretical concepts and demonstrate the viability of disintegration as a defeat mechanism.

CHAPTER 3

The Battle of Mogadishu

No historical experience elucidates these theoretical precepts and the utility and necessity of disintegration in an urban environment more than the recent experience of the U.S. Army in Mogadishu, Somalia in the summer and fall of 1993. Ma-ahinti Rangers, or "Day of the Rangers", is celebrated each year on 3 October in Somalia as a great Somali victory over an invading American military. While the Somali dead are estimated at over 500 with over 1000 wounded and American casualty figures at 18 dead and 73 wounded; the cascading effect of American casualties on American public opinion resulted in an American pullout from the region.[58] How could an American military force which enjoyed a tremendous technological and firepower advantage ultimately be forced to abandon its efforts to destroy the organization led by Mohamed Farrah Aidid? The answer to this question is complex and ranges the full spectrum of issues from national policy to a tactical over-reliance on attrition and firepower. This analysis will continue to focus on the lessons at the tactical level of war.

The Battle of Mogadishu on 3 and 4 October 1993 portrays an American tactical operation based upon an attrition mindset. The U.S. Army failed to view Mohamed Farrah Aidid and his organization as a complex adaptive military system. As a result, U.S. forces underestimated his ability to determine their natural line of expectation and to present an asymmetric problem for forces conducting a raid in an urban area. However, U.S. forces recognized the value of "decapitating" Aidid's organization to create cybernetic paralysis.[59] In fact the raid on 3 October 1993 sought to do just that by

capturing key leaders of Aidid's Hibr Gidr clan (namely Oman Salad and Mohammed Awale). Paradoxically, while conducting the raid to paralyze Aidid's organization, US forces failed to paralyze his organization in order to conduct the raid. The result was a battle of attrition in an urban area and unacceptable friendly and non-combatant casualties. This battle not only demonstrates an American failure to disintegrate but ironically portrays a Somali enemy that pursued a disintegration approach more than an American military that was far better equipped to do so.

In the eyes of Mohamed Farrah Aidid, leader of the Habr Gidr clan and ruler of Somalia by default, the clan was officially at war with America after an American missile attack on a meeting of clan leaders on 12 July 1993.[60] On behalf of the United Nations, the U.S. was seeking reprisal for the deaths of 24 Pakistanis incurred during a 5 June 1993 battle with Aidid's clan. Mogadishu was a foreboding place. The city was a collection of shanty towns, bandits and clansmen and the most despicable and unpredictable of urban warfare environments. In the words of reporter Mark Bowden, "The United Nations had learned the hard way not to send its soldiers into these places. Instead its leaders pinned their hopes on the high-tech methods of the U.S. military."[61] Accordingly, on 12 July 1993 U.S. helicopter gunships armed with rockets, miniguns, and TOW missiles attacked a gathering of Aidid's tribal elders in what became known as the "Abdi House".[62]

> In a large second-floor room, just before the shooting started, Qeybdid, Aidid's interior minister, stood to address a crowd of clan leaders. . .among the elders present were religious leaders, former judges, professors, and the clans most senior leader, Shiek Haji Mohamed Aden. . . In all there were 80 to 90 in the room (Aidid was not present). Some of the men were Aidid's close advisors, hard-liners. . .but some were moderates, men who saw themselves as realists. . . A significant part of

the crowd was there to argue for more cooperation with the United Nations.[63]

After the smoke cleared in the Abdi House, 50 to 70 members of the clan were dead. Ironically, in an attempt to use overwhelming firepower to destroy the clan by decapitating its leadership, the United States ensured that there were no longer any moderates in the clan. A unified Habr Gidr was now at war with America. To step up its efforts to remove Aidid from power the U.S. began to conduct raids to dismantle Aidid's organization from the top with the logic that removing the key leaders would end Aidid's influence in Somalia. "Task Force Ranger was not in Mogadishu to feed the hungry. Over six weeks, from late August until the Battle of Mogadishu on 3 October 1993 it conducted six missions, raiding locations where either Aidid or his lieutenants were believed to be meeting."[64] The 3 October mission was to conduct a raid of a suspected gathering of two of Aidid's top lieutenants, Omar Salad and Mohamed Hassan Awale, Aidid's top political advisor and "foreign minister" respectively. The concept of the operation was for an assault helicopter force including about 75 Rangers and 40 Delta Force troops in 17 helicopters to conduct a daylight air assault of the target house in downtown Mogadishu near the very crowded Bakara Market area. Delta Force soldiers would storm the target house and capture Aidid's lieutenants. Then four helicopter loads of Rangers would rope down to all four corners of the target block and form a perimeter. A ground convoy of 12 vehicles (mainly HMMWV's and 5 ton trucks), armed with .50 caliber machine guns and MK-19 Grenade launchers and some dismounted soldiers riding on board for security, staged at the airport. On order, they would ride three miles to the target building and escort the Somali prisoners and the assault team back to the

base. Helicopter gunships accompanied the air assault in the event the ground forces required additional firepower.[65]

The abduction of the targeted clan leaders went without incident and the target block security force was put into place. Then, the fog and friction of war began to take effect. An anticipated one hour mission ended some 15 hours later, as two of the air assault helicopters were shot down by ground RPG fire and two wheeled Quick Reaction Forces encountered ambush after ambush as they wound helplessly lost in the streets of Mogadishu. Eventually, an ad hoc armored Quick Reaction Force was assembled from UN-Malaysian equipment and the raiding force was extricated from their strong point near the first crash sight north of the target house. The QRF never reached the second downed helicopter and the pilot, Chief Warrant Officer Michael Durant was taken hostage. The bodies of Durant's colleagues were next seen on CNN being dragged by Somalis as part of a blood parade celebrating their "victory" over the Americans. As the events of 3 October 1993 unfolded, it became clear that the Habr Gidr were a complex mosaic of clansmen with a distinct decision-making hierarchy and a great many agents interacting dynamically to create a self organizing, adaptive enemy.

Habr Gidr: A Complex Adaptive Military System

The thought that you can destroy an organization by just taking the head man very rarely works out in practice because someone else is going to step up and take his place.[66]

U.S. Special Envoy to Somalia Robert B. Oakley, *Somalia-Good Intentions, Deadly Results*

What Special Envoy Robert Oakley knew intuitively was in fact that the Habr Gidr clan was a complex adaptive military organization. As Waldrop indicates in Complexity, ". . . self-organizing systems are adaptive in that they don't just passively respond to events the way a rock might roll around in an earthquake. They actively try to turn whatever happens to their advantage."[67] Mohamed Farrah Aidid had constructed a complex organization, with an intelligence collecting and analysis apparatus that was dynamically linked by a low-tech yet effective communications network. Aidid's system was carefully observing TF Ranger activity and developing an asymmetric response to what it saw as a reoccurring TF Ranger pattern of operations. The Habr Gidr network determined that TF Ranger was operating around a basic template since it's arrival in August 1993. Somali analysis indicated the following template. "Delta Commandos would storm the target building, Rangers would ring the target for security; helicopters would loiter overhead to control crowds and provide fire as needed. . .Despite attempts to vary the missions a pattern had been established before 3 October."[68] The Somali's determined the TF Ranger system's aim and method of execution. As Waldrop elicits, as an adaptive self-organizing system the Somali's reorganized in order to turn TF Ranger complacency to their advantage. In addition to adjusting their tactics, the Somalis restructured their communication mechanisms. Notably, "Aidid's Somali National Alliance (SNA) [also referred to as the Habr Gidr clan] militia had been developing a template of its own. South Mogadishu had been carved into 18 military sectors each with a duty officer on alert at all times. A crude radio network tied them together."[69] The events of 3 October 1993 clearly indicated that the Habr Gidr had in place a complex mechanism of control and information processing that allowed it to determine TF

Ranger's natural line of expectation, plan and conduct an asymmetric response and adapt rapidly to the changing urban battlefield.

Habr Gidr: An Asymmetrical Enemy

If you use a tactic twice you should not use it a third time. . .and the Americans had done basically the same thing six times.[70]

COL Ali Aden, SNA leader, Washington Post

The raids which preceded the Battle of Mogadishu on 3 October taught the Habr Gidr many things about TF Ranger and as an adaptive system they were making the necessary adjustments to present a problem set to the Rangers that ran contrary to the Ranger's natural line of expectation.[71] First, there were multiple reports after the battle that the Somali's were using non-combatant shields. Clearly understanding that non-combatant shields would present a difficult problem for an American force bound to an ROE, the Somali's used them often on 3 October to gain an advantage. Shortly after the raid began, the Rangers in Chalk Two were securing the northeast corner of the target block. SPC Shawn Nelson described one such asymmetric response:

> Taking cover behind a small car, Nelson saw a Somali with a gun prone on the dirt between two kneeling women. He had the barrel of his weapon between the women's legs, and there were four children actually sitting on him. He was completely shielded by noncombatants.[72]

Further, in the five missions preceding the Battle of Mogadishu TF Ranger had become enamored with short decisive raids that experienced relatively little Somali resistance and ". . .by late September, the Task Force had begun to hit stride with the capture of

Osman Atto, Aidid's banker."[73] As a result, TF Ranger's "natural line of expectation" became one focused on overwhelming firepower to conduct rapid seizure of the target area, capture of the target leaders and conduct exfiltration by way of a wheeled ground force. The operation on 3 October was "supposed to take about an hour".[74] Further evidence of this natural line of expectation is suggested by the fact that TF Ranger opted not to take additional water or night optical devices on the raid. They simply had become conditioned to expect short decisive operations even during a daylight raid.

The most striking evidence of asymmetry exhibited by the Somali's, however, involved their preparation of ground convoy ambushes and preplanned road barricades. Realizing that TF Ranger displayed a pattern of using ground exfiltration, the Habr Gidr complex military system adapted its techniques to counter the Ranger's firepower advantage.

> Abdikarim Mohamud worked as a secretary (at the U.S. embassy compound) for one of the American companies providing support services to the UN forces. . .Like most of his countrymen, Abdikarim had been hopeful about the United Nations when the humanitarian mission started. But when the Rangers came, the attacks began on the Habr Gidr clan. . and there was a mounting toll of Somalian dead and injured . . .Abdikarim became the eyes and ears for his clan. He knew by the time the assault force took off that afternoon that the Americans were headed for the Bakara Market and that after they 'fast-roped' in they would not be able to come back out on helicopters. That meant the Americans would be sending a column of vehicles to take them out. Before the Rangers had even roped down to Hawlwadig road, militiamen were preparing to erect ambushes and roadblocks on the streets around the market.[75]

The Habr Gidr's asymmetric response provides some valuable insights. TF Ranger had become enamored with its technological and firepower advantage. As a result they became predictable. This predictable "natural line of expectation" presented a perfectly

symmetrical set of conditions for an urban enemy seeking a means to nullify a firepower advantage. COL Sharif Hassan Guimale, Aidid's deputy commander of the High Commission on Defense, ". . .tried to adapt the lessons learned from years of clan warfare and from his extensive reading on Latin American guerrilla insurgencies to the developing TF Ranger pattern of operations."[76] Giumale developed simple adaptations to Somali tactics:

> TF Ranger stressed speed, so the militia had to react more quickly. The Americans greatest technological advantage - helicopters - had to be neutralized with barrage fire using rocket propelled grenades. The attacking force must be surrounded and its superior firepower offset by sheer numbers. . .Ambushes and barricades would try to impede American reinforcements.[77]

The American force fatally underestimated the Somali ability to synthesize the problem posed by dominating American technology and firepower. As a result TF Ranger did little to impede Somali efforts to make these critical adjustments. Enamored by their own success, overwhelming firepower, and a gross underestimate of the enemy, TF Ranger essentially ignored each of the five methods offered by Schneider to inflict cybershock on the Somali's. Conversely, the Somali's successfully employed nearly every method offered by Schneider. As a consequence, the Somalis were able to generate an asymmetric response. The Americans were unable or unwilling to recognize that the Somali's were operating asymmetrically. Somali control mechanisms played a key role on the battlefield.

Habr Gidr's Control Mechanisms

It was as if the whole damned city was trying to kill us[78]

An American soldier in the battle of Mogadishu, "Blackhawk Down"

The Somali's not only developed a somewhat sophisticated information control network but the network operated with impunity throughout the 15 hour Battle of Mogadishu. TF Ranger failed to gain the information dominance required to prevent an asymmetric response. Notably, TF Ranger disregarded the possibility that the enemy possessed a control mechanism sophisticated enough to significantly adapt to TF Ranger's speed and firepower advantage. Enemy control mechanisms, more than any other factor, contributed to the deaths of 18 Americans and the subsequent failure of the TF Ranger mission in Somalia.

Sources indicate that the Habr Gidr had a variety of control mechanisms that served to process information and allow the system to generate and execute an asymmetric response. Theory suggests that a system's aim dominates the control mechanism and guides it to its predetermined goal. In this case, revenge for the 12 July attack on the Abdi House had solidified support for Aidid among his clan and the populace in general.[79]

On the day of the attack one eyewitness recounted:

> When Yousif Dahir Mo'Alim heard the helicopters come in low, he grabbed his M-16 and quickly rounded up his 26 man militia. . .Mo'Alim and his men were veteran fighters, guns for hire, mostly, although everybody in Mogadishu was now fighting the Americans for free, some had begun calling themselves, in a play on the word Rangers, 'Revengers'.[80]

True to theory, this common aim became the dominant reason for the Habr Gidr's ability to generate and execute an asymmetric response.

Unified by a common purpose, the Somali control mechanisms, however rudimentary, were magnified tenfold in their effectiveness. Aidid's militia had constructed an intricate network of operatives working within the U.S. and UN compounds in Mogadishu[81], and a communication network consisting of low power radios[82], messengers[83], megaphones to rally crowd support[84], transport vans to mass militia at the critical point, and an effective signaling system using burning tires[85] to rally militia to a specific point in the city. These control mechanisms operated with impunity during the entire Battle of Mogadishu with three primary effects. First, the Somali's effectively massed RPG fires at the target house and downed two American helicopters. Next, the Habr Gidr militia and the hordes of Somali's that now supported their efforts rapidly encircled TF Ranger and the downed helicopters. Finally, the Somali's skillfully confused, trapped and decimated the Quick Reaction Force wheeled ground convoys sent to extract the assault force.[86]

The Battle of Mogadishu, therefore, provides empirical evidence that supports the theoretical presuppositions regarding the nature of a complex enemy system operating in an urban environment and highlights the central role of control mechanisms. This evidence demonstrates that when left unchecked, an enemy's control mechanisms, regardless of how primitive, can successfully guide a complex enemy to execute an asymmetric response. Further, superior firepower and maneuver proved inadequate to defeat a complex enemy system capable of adaptive, self-organizing behavior.

Analyzing TF Ranger Shortcomings:

Failure to Answer Asymmetry with Asymmetry

TF Ranger failed to conduct cyber-shock on the Somali complex system. Subsequently, they did not paralyze the Somali control mechanisms and the Somali's acted with impunity before and during the Battle of Mogadishu. Without cyber-shock, disintegration was impossible and attrition alone proved incapable of destroying the Somali system. TF Ranger intelligence failures, an underestimation of the Somali enemy, and an over-reliance on technology and firepower reduced TF Ranger's capacity to adapt and create an asymmetric response of its own.

Task Force Ranger failed to conduct cyber-shock in numerous ways. First, TF Ranger did not deny the enemy complete information through effective operation security (OPSEC), deception or psychological operations (PSYOPS). OPSEC failures in the US embassy and at the basecamp, and the predictable nature of TF Ranger operations in general gave the Somali's the information to mass forces at the right place and at the right time. No deception effort was conducted to divert the Somali militia and crowds to alternate target houses or to delay their arrival at the designated target house.

Secondly, electronic warfare was not employed to destroy the organizational coherence of the Habr Gidr. In the Somali case, for instance, positioning burning tires throughout the city would have in effect jammed that means of communication for the militia and created confusion among the Somali crowds. Even a minimal EW effort to influence the low powered radio network of the Habr Gidr would have delayed the militia effort to mass at the target building and to erect road barricades as rapidly as they did.

Third, active and intense reconnaissance was not used to blind the enemy. Coupled with OPSEC and PSYOPS a more effective human intelligence (HUMINT) effort could have served as the eyes and ears of TF Ranger weeks before the battle. The HUMINT effort should have alerted TF Ranger to the Somali control mechanisms and served as the key instrument in developing a response to confuse or delay the enemy. HUMINT was not used to determine enemy control mechanisms but to identify the human targets for the raids. This failure to maintain active reconnaissance among the population ceded the information advantage to the Somalis.

Fourth, US OPSEC failures and TF Ranger's predictability gave the Somali's the element of surprise. Unknown to the Americans, the Somali's knew the general target area and were prepared to mass militia, rally crowds and position road barricades before the Rangers fast roped in at the target house.

Finally, TF Ranger operations lacked the activeness and rapidity of operations to achieve temporal dislocation. While, the Task Force seized the target house and its 24 occupants according to the established timeline, failure to plan for the extraction of two downed helicopter crews and to disrupt the flexibility of the Somali's response to the wheeled convoys extended the operation in time to the advantage of the Somalis.

The American failure to conduct disintegration by seeking the paralytic effects of cybershock was compounded by U.S. intelligence failures which robbed U.S. planners of the insights necessary to recognize and adapt to a changing enemy. "The U.S. intelligence community had a difficult time attempting to collect, process, analyze, and disseminate intelligence between U.S. assets, and especially between coalition forces."[87] In part this difficulty resulted from inadequate HUMINT and SIGINT assets supporting

UNITAF.[88] Further, "the intelligence requirements were not sufficiently detailed to address intentions and capabilities, amount of weapons and ammunition, troop strength, organizational structure, command and control, or order of battle on the various Somali factions."[89] Without this intelligence support TF Ranger defaulted to its template for operations which it had validated in August and September of 1993. TF Ranger was predictable and therefore symmetrical.

TF Ranger's failure to conduct effective cyber-shock and protect themselves from cyber-shock permitted the Somali's to design and execute effective asymmetry. The preceding historical analysis suggests a dynamic interaction between the Somalis and TF Ranger whereby an action by one resulted in a reaction by the other. Clausewitz elucidates this interaction with an analogy:

> War is nothing but a duel on a larger scale. Countless duels go to make up war, but a picture of it as a whole can be formed by imagining a pair of wrestlers. Each tries through physical force to compel the other to do his will; his immediate aim is to throw his opponent in order to make him incapable of further resistance.[90]

TF Ranger possessed the basic capabilities of a complex system as envisioned by Waldrop. As a complex system, TF Ranger was capable of adaptive, self-organizing behavior, possessed an intricate series of control mechanisms, a common aim, and was capable of constructing an asymmetric response. Nonetheless, rather than exhibiting the adaptive, self-organizing behavior indicative of a complex system, TF Ranger presented a predictable "natural line of expectation" to its opponent. This in turn set the conditions for a successful Somali asymmetric response. The constraints placed upon the American military further enhanced the asymmetric nature of the Somali actions. The necessity for TF Ranger to conduct short, decisive, limited collateral damage operations in the

foreboding urban battlegrounds of Mogadishu hindered TF Ranger flexibility. Ironically TF Ranger sought to overcome these disadvantages with rapid maneuver and overwhelming firepower, thus reinforcing the predictable template of operations upon which the Somali's crafted their asymmetric response. Further, TF Ranger failed to determine the new Somali "natural line of expectation". Prior to the 3 October raid, the Task Force operated with relative impunity as Somali forces were unable to counter the rapidity of their operations. TF Ranger became fixated by what they perceived was the Somali predictable pattern of behavior in the weeks preceding the Battle of Mogadishu. Rapid mobility and firepower were adequate in accomplishing TF Ranger raids on each mission preceding the 3 October raid. TF Ranger did not view the Somalis as a complex system. As a result they did not recognize the need to adapt asymmetrically. TF Ranger failed to develop an asymmetric solution because they were fighting their predetermined plan and not the enemy.

TF Ranger failed to conduct cybershock and therefore was incapable of disintegrating the Somali's. The net result was a Somali force that had gained the information dominance required to deceive the US force, destroy its organizational coherence, blind it to Somali intentions, and which had the mechanisms in place to mass militia and the crowds at the decisive point. On 3 October 1993 the Somalis used cybershock to paralyze TF Ranger long enough to inflict unacceptable American casualties. Returning to Clausewitz's analogy, cyber-shock set the conditions for Somali disintegration operations. Clearly, the "Somali wrestler" found himself on top of the "TF Ranger wrestler", pinning his shoulders to the mat on the day since celebrated in Mogadishu as "Ma-ahinti Rangers".

Chapter 4

ANALYSIS OF ARMY AFTER NEXT TACTICAL METHODS

The American failures and Somali successes in Mogadishu offer lessons that serve as a valuable precursor to the AAN battlefield of 2025. AAN Wargame results indicate that the AAN REDFOR response poses a problem not unlike that experienced by US forces in the Battle of Mogadishu. Attrition and firepower are limited in this constrained environment. The Draft AAN "How to Fight Manual" correctly asserts:

> What works in the open desert environment will not be as effective in forested, mountainous and urban terrain where precision firepower is disadvantaged. Attrition effects are usually transitory, and they generally require great destruction (to property and non-combatants) even with precision weapons. Reliance on attrition approaches with 'precision engagement' may punish an enemy and risk no close combat casualties, but success in achieving the aims of such a campaign may be at risk. If low collateral damage is important, the attrition method, even with precision weapons, is likely to create more, especially in great urban areas.[91]

Further, "The disintegration approach should be used when vital interests are at stake, and rapid, decisive results are important, and when collateral damage is a concern. AAN studies indicate that when forces are capable of simultaneous and fully integrated air, land, sea, space, and special operations, under information dominance, they can achieve rapid disintegration of enemy resistance."[92] While AAN forces demonstrate disintegration capabilities in open terrain, they face significant challenges in complex

urban terrain. What adjustments to AAN tactical methods are required in order to facilitate the disintegration defeat mechanism?

The AAN tactical methods include knowledge dominance, precision engagement, and precision maneuver, organic tactical mobility, attack and defense. Knowledge dominance seeks to gain dominant situational awareness and determine when and where to conduct precision engagement and precision maneuver to rapidly disintegrate an opponents organization with minimal collateral damage. Precision engagement proposes to use information technologies and rapid deployment capabilities to enable "ambush-like" precision engagements against large formations.[93] This method creates shock in the enemy organization as he rapidly discovers that he has nowhere to turn. Preemption is likely if conditions for disintegration present themselves.[94] Precision maneuver supposes that superior tactical and operational mobility enable nearly immediate exploitation of precision engagements before the enemy system can recover or "adapt" to the effects of the precision engagement.[95] Organic Tactical Mobility (1000 km radius at 250+ km/hr) permits extended movement to the point of combat and rapid extraction regardless of terrain or enemy dispositions. Attack is an ambush of convergent, simultaneous blows conducted by integrated fires to cause disintegration through collapse of will, loss of organizational control, cohesion and coordinated action and the catastrophic loss of combat power. Defense is a "Shield of Blows" which aims to disintegrate the enemy by attacking the enemy's initial information advantage and key components of the attacking force array, gain information dominance, transition to the attack and complete disintegration before information dominance culminates. [96]

As currently envisioned, these tactical methods are incapable of disintegrating an urban enemy. First, *cyber-shock* must be included as a tactical method on the same level as precision maneuver and precision engagement. While AAN methods recognize the significance of targeting the enemy's will and organizational cohesion they do not consider the necessity to determine the enemy's "natural line of expectation" nor do they target the enemy's control mechanisms. Knowledge dominance will require an inordinate emphasis on HUMINT, OPSEC, EW, surveillance, reconnaissance, deception, surprise and rapidity of operations. This will enable a friendly force asymmetric response and sever the enemy system's information processing nervous system from its aim to induce cybernetic paralysis. For the urban environment this will require unique eavesdropping capabilities and a network of operatives that extends beyond special operations forces. Just as HUMINT shortcomings prevented TF Ranger from countering an asymmetric response, HUMINT capability is likely to be decisive in future urban battles. TRADOC development programs must focus on capabilities to determine the aim and control mechanisms for an adaptive complex enemy.

Precision engagement and precision maneuver must be capable of working complimentary with cybershock to attack key control mechanisms and destroy the enemy system's will by maneuvering to a position of advantage. Further, they must maintain the capability to annihilate and exhaust the enemy. This presents another great challenge for AAN concept and force developers. The constrained urban environment will require precision weapons that limit collateral damage and precision maneuver systems that permit unhindered movement on the surface, subterranean and in the three dimensional aspects of urban terrain.

Asymmetrical response should be added as a tactical method. While the American military should seek asymmetry in all tactical situations, when viewed as a tactical method in and of itself, *asymmetrical response* places the necessary focus on the enemy as a system susceptible to disintegration, versus merely a set of targets for annihilation. Asymmetrical response seeks to gain a period of knowledge dominance during which it determines the enemy's "natural line of expectation" while deceiving the enemy as to the friendly "natural line of expectation". The friendly course of action runs contrary to the enemy's "natural line of expectation" and may include attack and defense to execute an asymmetric response. Simultaneously, cyber-shock targets the enemy system's control mechanisms and the enemy experiences an unexpected enemy course of action that it is unable to detect or adapt to. *Asymmetric methods and cyber-shock* are necessary prerequisites to successful disintegration. Further, they provide conceptual flexibility to an AAN force that is required to conduct operations in a variety of environments and along the full spectrum of conflict.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

The Somali and American experiences in the Battle of Mogadishu provide empirical evidence that disintegration has practical value as a defeat mechanism in urban terrain. With modification, AAN tactical methods are capable of achieving disintegration effects. AAN concept developers, planners and commanders searching for solutions to the problem of defeating a complex enemy operating in urban terrain will find disintegration a useful conceptual construct.

The disintegration approach focuses concept developers, planners and commanders on the enemy as a complex system by elevating cyber-shock to equal footing with attrition and maneuver.[97] The disintegration approach embodies the colloquialism "fight the enemy and not the plan". Doctrine designed around disintegration places the enemy aim and control mechanisms at center stage. By elevating cyber-shock to equal partnership with attrition and maneuver, planners and executors avoid the dangerous over-reliance on attrition and maneuver technologies and capabilities. Apportioning assets to determine REDFOR aim and control mechanisms becomes critical to success. Disintegration puts the enemy system's aim and control mechanisms on par with the location of his anti-tank reserve, his artillery groupings, or the masses of his fighting force. Knowledge dominance requires an inordinate emphasis on human intelligence, operations security, electronic warfare, surveillance capabilities, reconnaissance, deception, surprise and rapidity of operations to identify the enemy

system's "natural line of expectation", create an asymmetric response and sever the enemy system's information processing nervous system from its brain. Gaining knowledge dominance becomes the key challenge to executing cyber-shock because of the adaptive nature of two complex enemies and the dynamic nature of their interaction on the battlefield.

AAN wargames must include simulations that adequately depict this interaction and effectively portray the effects of cyber-shock. Current wargame models are attrition and maneuver based. They do not adequately represent the shock effect of maneuver and attrition, and the degradation of the cohesion, will and control functions of the enemy system that are the targets of cyber-shock. This shortfall perpetuates the tendency to find solutions to the urban warfare dilemma which are attrition and maneuver based. Without demonstrated success during AAN wargames cyber-shock will not receive the equal status it requires.

The disintegration approach suggests that TRADOC concept developers focus on desired effects versus available or desired means. Annihilation, exhaustion, and cybernetic paralysis are the desired effects. The requirement to create these *effects* must form the basis for the development of tactical methods and new technologies. Future capabilities designed merely to create better *means* for maneuver, attrition or cybershock are unnecessarily limiting. A special hover craft designed to improve mobility in urban areas for the sake of better maneuver has value for force protection and gaining a positional advantage over the enemy to cause exhaustion. However, by focusing on the *effect* of exhaustion the disintegration defeat mechanism broadens the set of conceptual solutions. Cordons or isolation techniques like blockades combined with effective

technology, could produce the same exhaustion *effect* with less risk to friendly forces and non-combatants .[98] This is a conceptual versus a technological approach.

Disintegration places the concept of asymmetry at the nucleus of any urban warfare concept. The US experience in Mogadishu demonstrated first hand that gaining and maintaining asymmetry could be decisive. Asymmetry sets the conditions for successful cybernetic paralysis, annihilation and exhaustion. As with the dynamic interaction depicted by Clausewitz's wrestler analogy, once cybershock denies the enemy the capability to react asymmetrically the enemy is susceptible to the effects of attrition and maneuver and is in a position of great disadvantage. In this manner, disintegration can reduce the requirement for soldier intensive close operations, reduce collateral damage and reduce the risks to non-combatants and friendly forces.

Therefore, asymmetry alleviates the constraints placed on US forces to prevent collateral damage, friendly force and non-combatant casualties. Attrition and maneuver conducted against an enemy that enjoys an asymmetrical advantage requires an inordinate amount of firepower and masses of troops which inevitably leads to collateral damage and needless loss of life. Knowledge dominance provides the friendly force an asymmetric advantage which provides the ability to conduct precision engagement and precision maneuver against a paralyzed enemy. Collateral damage is reduced and force protection is maximized.

The requirement to generate an asymmetric response means that the Army After Next must be capable of a variety of operational and tactical options that will operate in tandem in the same battlespace. This will require an adaptive organization and adaptive individuals. Forcing our will upon the enemy with speed and firepower are only helpful

if the enemy is susceptible to speed and firepower. This will not likely be the case in urban terrain as it is in open terrain. In urban terrain cybernetic and maneuver approaches gain parity with firepower driven approaches. In his article "The Indirect Approach: How US Military Forces Can Avoid The Pitfalls Of Future Urban Warfare" MG Robert H. Scales Jr. proposes that the US military abandon its attrition based direct approach for operations in favor of a more balanced indirect approach when fighting campaigns in urban terrain. Firepower and maneuver are used to dominate the city's periphery and nodes within the city. Recognizing that the populace is a key control mechanism in the urban environment, a cordon of the city and intense information operations places the burden of support on the occupying enemy force. A "golden bridge" is established to allow safe passage of civilians from the city to safe havens in the periphery.[99] This presents an asymmetrical problem for the enemy for which he is unprepared. Time works against the enemy as he is increasingly unable to support himself or the populace. In this case a combination of tactical paralysis of the enemy organization, annihilation of critical nodes, domination of the city periphery and exhaustion wrought by the cordon create disintegration effects. [100]

Concepts provide the intellectual kindling required to generate the solutions that will ensure the dominance of the American military in the next millennium. This monograph suggests further examination of the concept of disintegration. How can the US military leverage technology and concepts to gain the knowledge dominance required to determine a complex urban enemy's aim and control mechanisms? How can doctrine and force structure facilitate the synergism required to annihilate, exhaust, and paralyze to disintegrate an enemy? How can the American military best achieve cybershock to

prevent future enemy's from gaining an asymmetric advantage? Successful answers to these questions will have far reaching impact on AAN experimentation, force structure and the security of the nation for years to come.

ENDNOTES

[1]Robert Holzer, "Krulak Warns of Over-Reliance on Technology," *Defense News*, 7-13 October 1996, 4. quoted in MAJ Raymond C. Finch III, "A Face of Future Battle: Chechen Fighter Shamil Basayev," *Military Review*, May - June 1997, 33.

[2]MAJ Raymond C. Finch III, "A Face of Future Battle: Chechen Fighter Shamil Basayev," *Military Review*, May - June 1997, 34.

[3] James J. Schneider, "Cybershock: Cybernetic Paralysis as a New Form of Warfare" (School of Advanced Military Studies, CGSC Fort Leavenworth course material Course 1 Lesson 1-38), 16 June 1995, passim. also found in James J. Schneider, "Black Lights: Chaos, Complexity and the Promise of Information Warfare," *Joint Forces Quarterly* 15 (Spring 1997) : 21-28.

[4] James J. Schneider, "Cybershock: Cybernetic Paralysis as a New Form of Warfare" (School of Advanced Military Studies, CGSC Fort Leavenworth course material Course 1 Lesson 1-38), 16 June 1995, passim.

[5]"Knowledge & Speed: The Annual Report on The Army After Next Project to the Chief of Staff of the Army," TDS, 18 July 1997, B-1.

[6] LTC Robert F. Hahn II, "FY 98 Insights from the AAN Urban Warfare Project", E-mail Microsoft word file dated 29 July 1998, 1.

[7] "Knowledge & Speed: The Annual Report on The Army After Next Project to the Chief of Staff of the Army," TDS, 18 July 1997, 14.

[8] Mark Hewish and Rupert Pengelley, "Warfare in the Global City," *International Defense Review* 031: 006, 01 June 1998 [journal on-line], 32; available from http://janes.ismc.sgov.gov/cgibin/Janes/Periodicals_shells/INTERNATIONAL_DEFENSE_REVIEW/1998

[9] US Department of Defense, Marine Corps Intelligence Agency, "The Urban Century: Developing World Urban Trends and Possible Factors Affecting Military Operations," by Matt van Konynenburg. Defense Intelligence Reference Document, MCIA-1586-003-97, (November 1997).

[10] "Draft AAN 'How to Fight' Manual", TD, 21 March 1998, 5 . Draft Operational Concept paper used internally by AAN wargame group at Fort Leavenworth, KS. This paragraph paraphrased entirely from this source.

[11] Ibid., 13-15 . Draft Operational Concept paper used internally by AAN wargame group at Fort Leavenworth, KS. This paragraph paraphrased entirely from this source.

[12] MG Robert H. Scales Jr., "The Indirect Approach How US Military Forces Can Avoid The Pitfalls Of Future Urban Warfare". *Armed Forces Journal International* (October 1998) : 68.

[13] LTC Robert F. Hahn II, "FY 98 Insights from the AAN Urban Warfare Project", E-mail file dated 29 July 1998, 2.

[14] LTC Robert F. Hahn II, "Urban Warfare Operational Concept (Draft)" J8 Urban Working Group PowerPoint slide presentation, 2 September 1998, Future Battle Directorate US Training and Doctrine Command, slide 5.

[15] Ibid., slide 5 and 6. Preclusion/Preemption is a nondoctrinal term defined here by the Urban Working Group. The diagram is replicated from the same slide presentation.

[16] Ibid., slide 5 and 6. Definition of Denial was taken from FM 101-5-1. The diagram is replicated from the same slide presentation.

[17] Ibid., slide 5 and 6. Containment is taken from Joint Pub 1-02. The diagram is replicated from the same slide presentation.

[18] Ibid., slide 5 and 6. Eviction is a nondoctrinal term defined here by the Urban Working Group. The diagram is replicated from the same slide presentation.

[19] The "Draft AAN 'How to Fight' Manual", TD, 21 March 1998, does not address tactical methods. This manual focuses on the strategic and operational level. As of 30 November, 1998, the Urban Working Group of the Future Battle Directorate, TRADOC was continuing its focus on the operational level of war. As described in Chapter 4 of this monograph, AAN tactical method development is outlined in a series of Powerpoint presentations developed by members of the Urban Working Group.

[20] "Draft AAN 'How to Fight' Manual", TD, 21 March 1998, 5 . Draft Operational Concept paper used internally by AAN wargame group at Fort Leavenworth, KS.

[21] The American Heritage Dictionary, Second College Edition (1985).

[22] "FM 100-5 Operations" [Revised Final Draft], 19 June 1998, Headquarters, Department of the Army, 2-16.

[23] Richard Swain, "B.H. Liddell Hart and the Creation of a Theory of War, 1919-1933". *Armed Forces and Society* 17 no 1 (Fall 1990) : 42.

[24]MG Robert H. Scales Jr., "The Indirect Approach How US Military Forces Can Avoid The Pitfalls Of Future Urban Warfare". *Armed Forces Journal International* (October 1998) : 72.

[25] Ibid., 71.

[26] Richard Swain, "B.H. Liddell Hart and the Creation of a Theory of War, 1919-1933". *Armed Forces and Society* 17 no 1 (Fall 1990) : 42.
[27] James J. Schneider, "Cybershock: Cybernetic Paralysis as a New Form of Warfare" (School of Advanced Military Studies, CGSC Fort Leavenworth course material Course 1 Lesson 1-38), 16 June 1995, 2-3.

[28] Ibid., 5.

[29] Ibid. as taken from the book John L. Casti, *Complexification* (New York: Harper-Collins, 1994).

[30] Ibid.

[31] Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass Publishers, 1997), 3-5.

[32] Ludwig von Bertalanffy, *General System Theory* (New York, 1975), 3. quoted in Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass Publishers, 1997), 4.

[33] M. Mitchell Waldrop, *Complexity* (New York: Simon and Schuster,1992), 11.

[34] Ibid.

[35] Ibid.

[36] These characteristics taken from M. Mitchell Waldrop, *Complexity* (New York: Simon and Schuster,1992), 11-12.

[37]James J. Schneider, "Black Lights: Chaos, Complexity and the Promise of Information Warfare," *Joint Forces Quarterly* 15 (Spring 1997) : 26.

[38] James R. Beniger, *The Control Revolution.* (Cambridge, MA: Harvard University Press, 1986), 7.

[39] Ibid., 40.

[40] Ibid., 48.

[41] Schneider, "Cybershock," 6.

[42] Schneider. "Black Lights," paraphrased from 27.

[43] Beniger, *The Control Revolution,* paraphrased from 12.

[44] Ibid., 37.

[45] Ibid.

[46] Shimon Naveh, *In Pursuit of Military Excellence*, 5.

[47] Ludwig von Bertalanffy, *General System Theory* (New York, 1975), 68-70. quoted in Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass Publishers, 1997), 5-6.

[48] Naveh, 14.

[49] Naveh, 14 and 15.

[50] Naveh, 42. Naveh asserts that at the operational level of war. ."there is the simple fact that systems cannot be physically destroyed." Destruction of mass armies and indeed national armies requires the loss of system coherence. He asserts that western militaries, infatuated with the Clausewitzian dictum of destruction, nonetheless, apply the destruction paradigm to solve the problem that can only be effectively addressed through a system's approach. This information and logic trail was offered to me by MAJ John Sutherland during a discussion of Naveh's view of complex systems.

[51] Schneider, "Cybershock," Figure 3.

[52] Schneider, "Cybershock," 7. Cybershock is a pattern of warfare that causes paralysis by attacking the enemy's nervous system in the same way that maneuver causes exhaustion by defeating the opponent's metabolic system; his logistics. Basically, cybershock attacks the directive authority of the system and the flow of information that transmits the system's aim between component parts. This destroys the dynamic interaction between the component parts of the system required to make it adaptive. Once a system loses this capability it becomes more susceptible to the effects of attrition and maneuver and can disintegrate.

[53] Ibid., 8.

[54] Ibid., 7-8.

[55] This excerpt taken directly from Schneider's theory of disintegration in Schneider, "Cybershock," 8-9.

[56] Ibid., 10.

[57] Schneider, "Black Lights," 27.

[58] Mark Bowden, "Blackhawk Down," *Philadelphia Inquirer Online*, 16 November 1997, [article on-line] available from http://www3.phillynews.com/package/somalia. accessed and printed 10 January 1998, Introduction 1 of 5.

[59] Bowden, "Blackhawk Down," 14 December 1997, Analysis 7 of 9.

[60] Bowden, "Blackhawk Down," 16 November 1997, Introduction 4 of 5.

[61] Bowden, "Blackhawk Down," 14 December 1997, Analysis 3 of 9.

[62] Ibid.

[63] Ibid.

[64] Bowden, "Blackhawk Down," 16 November 1997, Introduction 4 of 5.

[65] Rick Atkinson, "The Raid That Went Wrong: How an Elite US Force Failed in Somalia," *Washington Post*, 30 January 1994, paraphrased from sec. A, p. 27 col 2.

[66] Interview with former U.S. Special Envoy to Somalia during Operation Restore Hope Robert B. Oakley as shown in *SOMALIA Good Intentions, Deadly Results*, VCR format, 56 min., (Knight Ridder Video, 1997), counter number 21:15.

[67] Waldrop, *Complexity*, 11-12.

[68] Atkinson, "The Raid That Went Wrong," sec. A, p. 27 col 1.

[69] Ibid.

[70] Atkinson, "The Raid That Went Wrong," sec. A, p. 27 col 2.

[71] Ibid.

[72] Bowden, "Blackhawk Down," Chapter 4 p. 3 of 5.

[73] Ibid., Introduction p. 4 of 5.

[74] Ibid., Introduction p. 1 of 5.

[75] Ibid., Chapter 21 p. 3 of 5. See also Chapter 15 p. 4 of 6, Chapter 16 p. 2 of 6 and Chapter 24 p. 4 of 5 for eyewitness accounts of the clans ability to track wheeled convoys and rapidly erect barricades to trap them in ambushes.

[76] Atkinson, "The Raid That Went Wrong," sec. A, p. 27 col 2.

[77] Ibid.

[78] Bowden, "Blackhawk Down," Chapter 10 p. 2 of 5.

[79] Ibid., Chapter 1 p. 7 of 12; see also Naveh, 5 and 14 regarding the dominance of system aim.

[80] Ibid., Chapter 6 p. 3 of 4.

[81] Ibid., Chapter 21 p. 3 of 5.

[82] Rick Atkinson, "Night of a Thousand Casualties: Battle Triggered US Decision to Withdraw From Somalia," *Washington Post* , 31 January 1994, sec. A p. 1 col. 1.

[83] Ibid., sec. A p. 11 col. 3.

[84] Bowden. "Blackhawk Down," Chapter 21 passim.

[85] Ibid., Chapter 1 p. 4 of 12 and p. 6 of 12.

[86] Ibid., Chapter 24 p. 4 of 5.

[87] Payton A. Flynn, "From Humanitarian Assistance to Nation Building: UN Mission Change and Its Impact on the Intelligence Process," available from http://delphi-s.dia.smil.mil/proj/JMIC/ISBN-0-9656195-0-8/imda_chp3d2.html, 1.

[88] Ibid., 2.

[89] Ibid.

[90] Carl von Clausewitz, *On War* (Princeton, NJ: Princeton University Press, 1976), 75.

[91] "Draft AAN 'How to Fight' Manual", TD, 21 March 1998, 14.

[92] Ibid., 7.

[93] "Future (2025) Joint Operations and Land Power Tactics," Powerpoint slide presentation (September 1997), slides 20 -33 passim.

[94] "Knowledge & Speed: The Annual Report on The Army After Next Project to the Chief of Staff of the Army," TDS, 18 July 1997, 10.

[95] "Future (2025) Joint Operations and Land Power Tactics," Powerpoint slide presentation (September 1997), slides 20 -33 passim.

[96] AAN tactical methods are summarized at "AAN98 Concepts: Future Landpower Operations," Powerpoint slide presentation, slide 3.

[97] Schneider, "Cybershock," 2.

[98] MG Robert H. Scales Jr., "The Indirect Approach How US Military Forces Can Avoid The Pitfalls Of Future Urban Warfare". *Armed Forces Journal International* (October 1998) : 74.

[99] Sun Tzu, *The Art of War*, trans. Ralph D Sawyer (Boulder, Co: Westview Press, 1994), 199. Sun Tzu says: "If you besiege an army you must leave an outlet. Do not press an exhausted invader."

[100] MG Scales offers one such conceptual approach in "The Indirect Approach How US Military Forces Can Avoid The Pitfalls Of Future Urban Warfare". *Armed Forces Journal International* (October 1998) : 74.

BIBLIOGRAPHY

Books

The American Heritage Dictionary. Second College Edition, 1985.

Belfield, Eversley. Defy and Endure: Great Sieges of Modern History. New York: Crowell-Collier Press, 1967.

Beniger, James R. The Control Revolution. Cambridge, MA: Harvard University Press, 1986.

Bertalanffy, Ludwig von. General System Theory. New York, 1975.

Clausewitz, Carl von. On War. Princeton, NJ: Princeton University Press, 1976.

Davis, M. Thomas. 40 km into Lebanon: Israel's 1982 Invasion. Washington, D.C. : National Defense University Press, 1987.

Delk, James D. Fires and Furies: The L.A. Riots. Palm Springs: ETC Publications, 1995.

Kaplan, Robert D. The Ends of the Earth. New York: Random House, 1996.

Khalidi, Rashid. Under Siege: P.L.O. Decision Making During the 1982 War. New York: Columbia University Press, 1986.

Kohl, James and John Litt. Urban Guerrilla Warfare in Latin America. Cambridge: MIT Press, 1974.

Naveh, Shimon. In Pursuit of Military Excellence: The Evolution of Operational Theory. London: Frank Cass Publishers, 1997.

Nooy, Gert de. The Clausewitzian Dictum and the Future of Western Military Strategy. The Hague: Kluwer Law International, 1997.

Senge, Peter M. The Fifth Discipline. New York: Currency Doubleday, 1990.

Simon, Ronald David. Urban Insurgency and Counterinsurgency Programs: A Case Study of Jewish Insurgency in Palestine, 1943-1948. Ann Arbor: UMI Press, 1976.

Sun Tzu. The Art of War. trans. Ralph D Sawyer. Boulder, CO: Westview Press, 1994.

Taw, Jennifer Morrison and Bruce Hoffman. The Urbanization of Insurgency: The Potential Challenge to U.S. Army Operations. Santa Monica: Rand Arroyo Center, 1994.

Waldrop, M. Mitchell. Complexity: The Emerging Science at the Edge of Order and Chaos. New York: Simon and Schuster, 1992.

Watson, Bruce Allen. Sieges A Comparative Study. Westport: Praeger, 1993.

Monographs

Bunker, Robert J. "Five-Dimensional (Cyber) Warfighting: Can the Army After Next be Defeated Through Complex Concepts and Technologies?." U.S. Army War College: Strategic Studies Institute, March 10, 1998.

Flynn, Payton A. "From Humanitarian Assistance to Nation Building: UN Mission Change and Its Impact on the Intelligence Process." available from http://delphi-s.dia.smil.mil/proj/JMIC/ISBN-0-9656195-0-8/imda_chp3d2.html.

Glenn, Russell W. "Combat in Hell, A Consideration of Constrained Urban Warfare." Arroyo Center, National Defense Research Institute, RAND publications, 1996.

Johnson, Kevin D. "Intelligence Preparation of the Urban Battlefield." School of Advanced Military Studies USCGSC Monograph, AY 90-91.

Schneider, James J. "Cybershock: Cybernetic Paralysis as a New Form of Warfare." SAMS: Fort Leavenworth, 16 June 1995.

_____. "How War Works." SAMS: Fort Leavenworth, 16 June 1995.

van Creveld, Martin. "What is Wrong with Clausewitz." contained in the book by Gert de Nooy. *The Clausewitzian Dictum and the Future of western Military Strategy.* (The Hague: Kluwer Law International, 1997), 7-23 passim.

Periodical Articles

Atkinson, Rick. "The Raid That Went Wrong: How an Elite US Force Failed in Somalia." Washington Post. 30 January 1994.

_____. "Night of a Thousand Casualties: Battle Triggered US Decision to Withdraw From Somalia." Washington Post. 31 January 1994.

Betts, Richard. "The Downside of the Cutting Edge." The National Interest No 45 Fall 1996, 80-83.

Bowden, Mark. "Blackhawk Down." *Philadelphia Inquirer Online,* 16 November 1997, [article on-line] available from http://www3.phillynews.com/package/somalia.

Bunker, Robert J. "Advanced Battlespace and Cybermaneuver Concepts: Implications for Force XXI." Parameters, Vol 26, No. 3, Autumn 1996.

Dunlap, Charles J. Jr. "21st Century Land Warfare: Four Dangerous Myths." Parameters Vol. 27 No. 3, Autumn 1997, 27-37.

Finch III, MAJ Raymond C. "A Face Of Future Battle: Chechen Fighter Shamil Basyev." Military Review May-June 1997: 33-41.

Hewish, Mark and Rupert Pengelley. "Warfare in the Global City." International Defense Review Vol. 31 Issue 006, June 01, 1998, 32-44. [journal on-line], 32; available fromhttp://janes.ismc.sgov.gov/cgibin/Janes/Periodicals_shells/INTERNATIONAL_DEFENSE_REVIEW/1998.

Holzer, Robert. "Krulak Warns of Over-Reliance on Technology." Defense News, 7-13 October 1996.

Peters, Ralph. "The New Warrior Class." Parameters, Vol 24 No 2, Summer, 1994: 16-26.

Scales Jr., MG Robert H. "Cycles of War: Speed and Maneuver Will be the Essential Ingredient of An Information- Age Army." Armed Forces Journal International Vol. 134, July 1997.

_____. "The Indirect Approach How US Military Forces Can Avoid The Pitfalls Of Future Urban Warfare." Armed Forces Journal International. October 1998.

Schneider, James J. "Black Lights: Chaos, Complexity, and the Promise of Information Warfare." Joint Force Quarterly Vol 15, Spring 1997.

SOMALIA Good Intentions, Deadly Results. VCR format, 56 min., (Knight Ridder Video, 1997), counter number 21:15

Swain, Richard. "B.H. Liddell Hart and the Creation of a Theory of War, 1919-1933." Armed Forces and Society 17 no 1 Fall 1990.

Tucker, David. "Fighting Barbarians." Parameters Vol 28 No. 2, Summer 1998, 69-78.

Warden III, John A. "The Enemy as a System." Airpower Journal, Spring 1995, 42-55.

Government Publications

US Department of the Army. " The Annual Report on the Army After Next Project to the Chief of Staff of the Army." Washington: July 1997.

US Department of Defense, Marine Corps Intelligence Agency. "The Urban Century: Developing World Urban Trends and Possible Factors Affecting Military Operations." by Matt van Konynenburg. Defense Intelligence Reference Document, MCIA-1586-003-97, (November 1997).

Unpublished Works

"Draft AAN 'How to Fight' Manual." TD, 21 March 1998, 5 . Draft Operational Concept paper used internally by AAN wargame group at Fort Leavenworth, KS.

"FM 100-5 Operations" [Revised Final Draft]. 19 June 1998, Headquarters, Department of the Army, 7-3.

"Knowledge & Speed: The Annual Report on The Army After Next Project to the Chief of Staff of the Army." TDS, 18 July 1997.

LTC Robert F. Hahn II. "FY 98 Insights from the AAN Urban Warfare Project", E-mail file dated 29 July 1998.

_____. "Urban Warfare Operational Concept (Draft)" J8 Urban Working Group PowerPoint slide presentation, 2 September 1998, Future Battle Directorate US Training and Doctrine Command, slide 5.

Wass de Czege, BG (R) Huba. "Future (2025 Joint Operations and Land Power Tactics." Briefing Slides, September, 1997.

Wass de Czege, BG (R) Huba. "AAN 98 Concepts: Future Landpower Operations." Briefing Slides, September, 1997.

Wass de Czege, BG (R) Huba. "Air Mechanization by 2025?." Briefing Slides, 20 May, 1996.